1989 PEST CONDITIONS REPORT WORKSHEET

PEST (COMMON NAME): Forest Tent Caterpillar

(SPECIFIC NAME): Malacosoma disstria

HOST: Aspen, oak, maple

PRESENT CONDITION:

AREA (TOTAL ACRES):

LOCATION: Northern Lower Peninsula

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

399,360 acres of defoliation greater than 50% in 18 counties.

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

May be compounding drought-related stress resulting in localized mortality of oak, aspen, and maple.

TREND:

PAST TO PRESENT: Increasing to peak in 1989

FUTURE: Declining, with persistent local outbreaks in 1990.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

State forest campgrounds with nuisance populations aerially treated with B.t. Fixed-wing, neat application, 12 B.I.U.s/acre. Good control.

COMMENTS:

Continues to follow a ten-year outbreak cycle in the state, with outbreaks lasting three to four years.

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): FOREST TENT CATERPILLAR

(SPECIFIC NAME): MALACOSOMA DISSTRIA

HOST: ASPEN, MAPLE, OAK

PRESENT CONDITION:

AREA (TOTAL ACRES): 703,944

LOCATION: MICHIGAN'S UPPER PENINSULA

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

(See attached Map and Table)

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Third year of epidemic. Spread to Eastern U.P. in 1988 defoliating 316,000 ac.

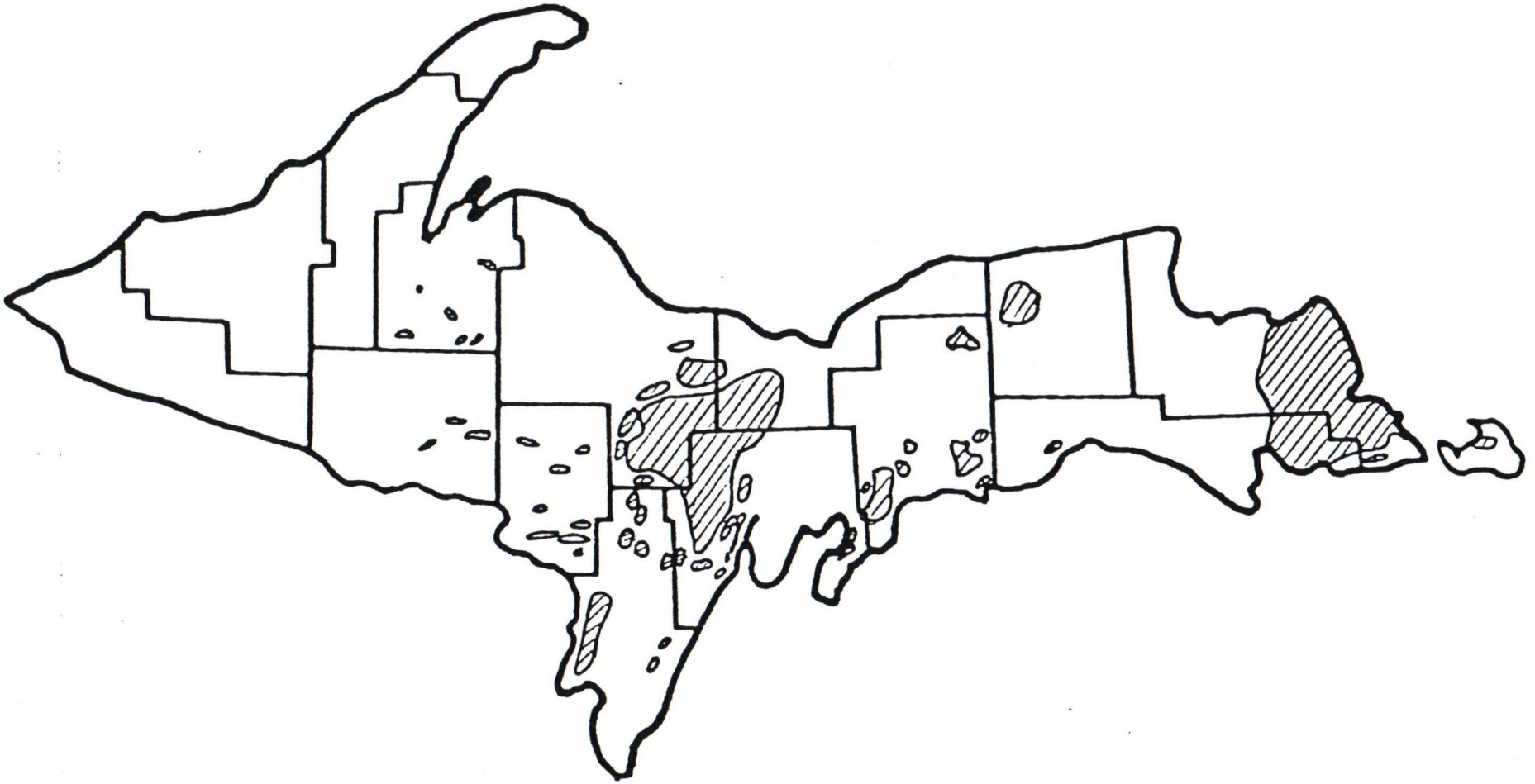
FUTURE: Expect at least a partial collapse of populations in most areas of the U.P. Sacrophagids were extremely abundant in many areas. Pupal and egg parasitism is high.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: No spray programs to date. Drought in 1988 has complicated impacts. Many aspen in the Eastern U.P. only weakly reflushed. Widespread oak mortality in Menominee County where combined impacts of 1988 drought and FTC defoliation predisposed trees to two-lined chestnut borer attack. Maples are not favored hosts compared to aspen and oak in the U.P. This is in sharp contrast to the Lower Peninsula where sugar maple is favored. Aspen was defoliated a second time by the Large Aspen Tortrix - a recurring problem in the Eastern U.P.

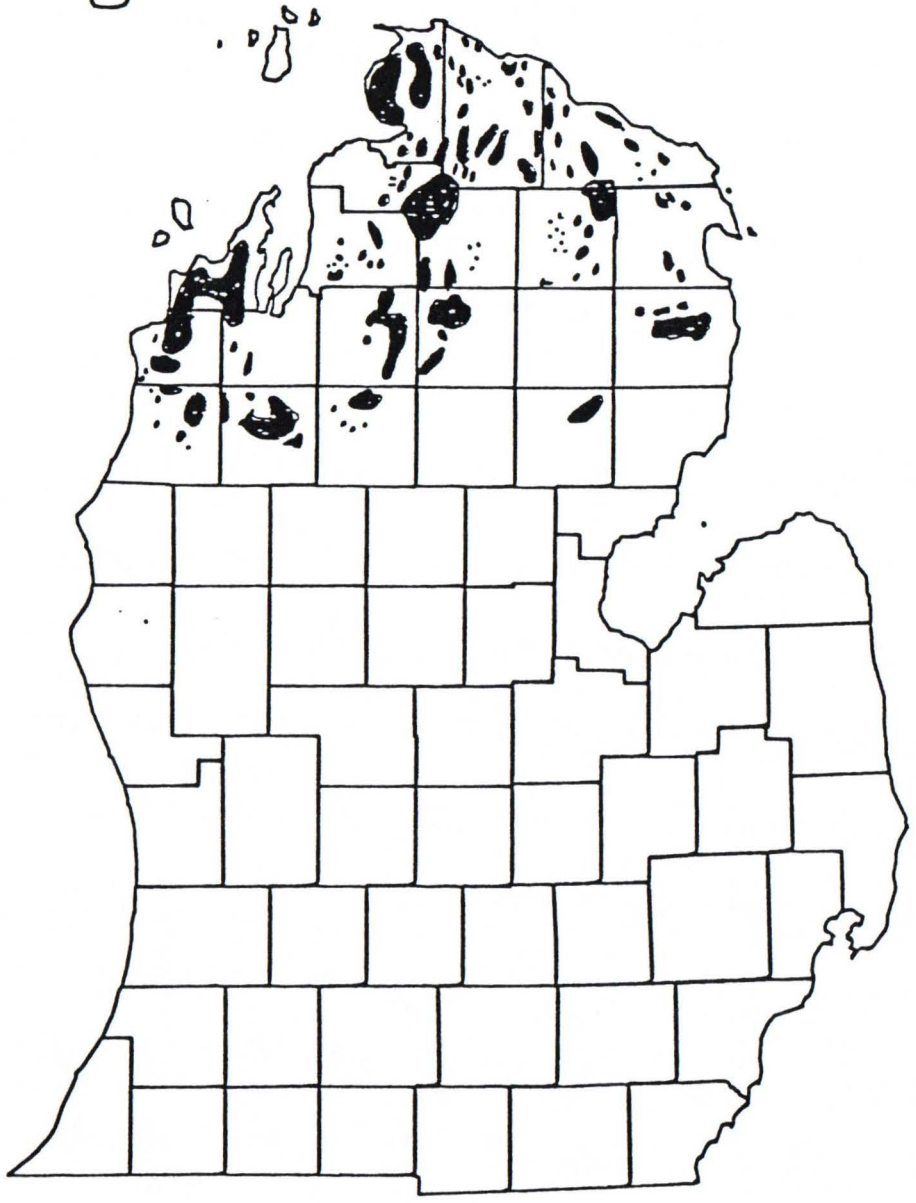
FOREST TENT CATERPILLAR DEFOLIATION IN MICHIGAN'S UPPER PENINSULA

1989



Forest Tent Caterpillar

Michigans Lower Peninsula



1989 PEST CONDITIONS REPORT

1

PEST (COMMON NAME): GYPSY MOTH

(SPECIFIC NAME): LYMANTRIA DISPAR

HOST: OAKS, APSEN, TREES IN GENERAL

PRESENT CONDITION:

AREA (TOTAL ACRES):

LOCATION: CHIPPEWA, LUCE, MACKINAC, SCHOOLCRAFT, AND MENOMINEE COUNTIES

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

No defoliation

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

N.A.

TREND:

PAST TO PRESENT: Moths detected in increasing numbers the last three years. Many moths trapped in the Eastern U.P. Multiple catches recorded in many traps as far west as Luce County with many single catches in Schoolcraft County. Trap catches in the extreme eastern portion of the U.P. north of the Machinac Bridge were in the hundreds. The only known "established" population detected in the U.P. was found in Menoninee County in 1988. Many egg masses were found in an area north of Menominee on the Menominee River.

FUTURE: Heavily infested Lower Peninsula provides many opportunities for movement of life stages into the U.P. This pressure will not diminish. The potential for gypsy moth defoliation will be tested in the U.P. in the next few years. The predominate aspen type in the Eastern U.P. and the oak area of Menoninee County offer the most opportunity for successful infestation. The rest of the U.P. is northern hardwoods with scattered aspen stands.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: Attempts to eradicate the Menoninee County infestation appear hopeful as no moths were trapped within the spray block. It appears that the 300 acre spray block boundary should have been extended a short distance north. A few moths were trapped on the northern perimeter of the spray block. A second eradication effort is likely.

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): EXTREME DROUGHT OF 1988

(SPECIFIC NAME): CLIMATIUS ARIDEH!

HOST: Quercus sp., Pinus sp., Acer saccharum, Populus tremuloides

PRESENT CONDITION:

AREA (TOTAL ACRES): N.A.

LOCATION: Michigan's U.P.

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

Oak decline and scattered individual trees and pockets of oak mortality. Weakly foliated aspen in the Eastern U.P. with unknown future impacts from roots diseases and secondary insects. Some ips mortality in jack pine but not nearly the loss experienced in other areas of the Lake States. Few reports of apparently healthy sugar maple with decayed root systems - white rot with zone lines similar to and may be Armellaria.

TREND:

PAST TO PRESENT: Droughts in 1976, 1983-84 and 1988. Presently (Fall, 1989) the U.P. is 6-7 inches below average rainfall. A dry spring in 1990 could negatively impact already drought stressed forest resource. Widespread defoliation of aspen from Forest Tent Caterpillar is a serious compounding stress on the oak and aspen resource.

FUTURE: Drought conditions in the next two years could have severe and far reaching negative impacts - especially on the oak and aspen resource, and possible on sugar maple in some areas.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: Let's pray for a wet 1990. (Short of floods!)

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): SCLERODERRIS CANKER - LAKE STATES STRAIN

(SPECIFIC NAME): Gremmeniella abietina or lagerbergii

HOST: RED, JACK & SCOTTS PINE

PRESENT CONDITION:

AREA (TOTAL ACRES): NEGLIGIBLE

LOCATION: LUCE & MARQUETTE COUNTIES

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

FEW, SCATTERED POCKETS OF LIGHT FLAGGING ON LOWER WHORLS

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

NONE

TREND:

PAST TO PRESENT:

TWELVE YEARS SINCE SIGNIFIANT TREE MORTALITY IN YOUNG PLANTATIONS.

FUTURE:

UNKNOWN

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS:

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): YELLOWHEADED SPRUCE SAWFLY

(SPECIFIC NAME): PIKONEMA ALASKENSIS

HOST: SPRUCE

PRESENT CONDITION:

AREA (TOTAL ACRES): UNKNOWN

LOCATION: HOUGHTON, KEEWENAW, ONTONOGON & BARAGA COUNTIES

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

Some ornamental spruces totally defoliated. Many fewer reports from homeowners this year.

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

Smaller (< 6') ornamental and open grown spruce killed in some areas.

TREND:

PAST TO PRESENT: This was the fourth year of defoliation in these areas. Activity was much reduced this year from last year.

FUTURE: Unknown. Collapse is expected in next year or two if historic cycle is repeated.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS:

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): SPRUCE BUDWORM

(SPECIFIC NAME): CHORISTONEURA FUMIFERANA

HOST: WHITE SPRUCE, BALSAM FIR

PRESENT CONDITION:

AREA (TOTAL ACRES): Negligible

LOCATION: MICHIGAN'S UPPER PENINSULA

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Last epidemic ended started in the late 1960's and ended in 1985.

FUTURE: No wide-scale outbreak expected until next century.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: Now is the time to reduce stand ages to 50 years or less; to begin regulating the mixture of age classes to reduce the area of single age stands; to encourage the spruce component of regenerated stands to reduce risk; or convert balsam fir stand to other species to break up large contiguous areas of balsam fir.

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): REDHEAD PINE SAWFLY

(SPECIFIC NAME): NEODIPRION LECONTEI

HOST: RED PINE, JACK PINE

PRESENT CONDITION:

AREA (TOTAL ACRES):

LOCATION: Mackinac county

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

A dozen small colonies eliminated in one planting.

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Sawfly populations were at peak epidemic levels in 1985-86. Little activity in 1988-89.

FUTURE: Will continue to have periodic sawfly problems where conditions such as vegetative competition and poor soils cause stress in young plantations.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

Malathion was used in a solo back pack sprayer. Control costs were $10/ac.

COMMENTS:

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): Orangehumped Mapleworm

(SPECIFIC NAME): Symmerista leucitys

HOST: Sugar Maple

PRESENT CONDITION:

AREA (TOTAL ACRES): No detected activity

LOCATION: Chippewa County

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

NONE

TREND:

PAST TO PRESENT:

COMPARATIVE DEFOLIATION

YEAR	DEFOLIATION	ACRES
1985	LIGHT	240
	MODERATE	1360
	HEAVY	5340
1986	MOD/HVY	2420
1987	HEAVY	730
1988	MOD/HVY	100
1989		0

FUTURE:

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS:

BRIEF NARRATIVE COVERING OVERALL FOREST PEST CONDITIONS

1989

The extreme drought beginning in the spring of 1987 and continuing presently is the largest single factor contributing to U.P. forest health problems. Although 1989 was wet compared to 1988, we will enter the 1990 growing season 6-7 inches below normal rainfall. The oak and aspen resource of the U.P. has been subjected to additional stresses. The Forest Tent Caterpillar defoliated 318,000 acres in 1988 and 704,000 acres in 1989. Aspen was defoliated for a second time in 1988-89 by the Large Aspen Tortrix. These stresses have produced weekly foliated aspen in many areas of the Eastern U.P. and many pockets of two-lined chestnut borer mortality in South-Central U.P. oak forests.

The Menominee County Oak Wilt Project entered an important phase of project completion in 1989. No new epicenters were detected. All 236 detected epicenters have double vibratory plow lines isolating infected trees from surrounding healthy trees. Most trees within the inner plow line have been killed to remove present and future inoculum source for over-land spread. With continued detection and rapid control of new epicenters, oak wilt as a threat to the survival of this 10,000 acre oak forest will be effectively controlled. Time will tell if our eradication goal can be accomplished.

The gypsy moth is entering the U.P. Numerous moths were trapped throughout the Eastern U.P. Multiple catches of adults in pheromone traps were common as far east as Luce County. The Menominee County eradication effort using three applications of B.t. showed positive results. A few moths were trapped on the northern boundry of the 300 acre spray block. A renewed effort in 1990 is probable. No spray program in 1990! No act. life stages detected.

The Jack Pine Budworm epidemic projected for 1989 did not materialize. This helped reduce risks of jack pine to bark beetles (Ips pini). We had few reports of bark beetle induced losses in red or jack pine.

Lyme's disease continues to be a major concern. Many calls were handled. Our current understanding of Lyme's disease incidence and spread leaves much room for improvement.

BRIEF NARRATIVE COVERING OVERALL FOREST PEST CONDITIONS

MICHIGAN'S UPPER PENINSULA

1989

The extreme drought beginning in the spring of 1987 is the largest single factor contributing to U.P. forest health problems. Although 1989 was wet compared to 1988, we are entering the 1990 growing season with below normal rainfall. The oak and aspen resource of the U.P. has been subjected to additional stresses. The Forest Tent Caterpillar defoliated 318,000 acres in 1988 and 704,000 acres in 1989. Aspen was defoliated for a second time in 1988-89 by the Large Aspen Tortrix. These stresses have produced weekly foliated aspen in many areas of the Eastern U.P. and many pockets of two-lined chestnut borer mortality in South-Central U.P. oak forests.

The Menominee County Oak Wilt Project suffered two set-backs in 1989. We were unable to contract a vibratory plow until December. Frozen ground at this time delayed plowing until the 1990 growing season. Although no new epicenters were detected, we had hoped that all 236 detected epicenters would have double vibratory plow lines in 1989. Trees within established inner plow lines have been herbicided to remove present and future inoculum source for over-land spread. With continued detection and rapid control of new epicenters, oak wilt as a threat to the survival of this 10,000 acre oak forest will be effectively controlled. Time will tell if our eradication goal can be accomplished. The second set-back was the wide-spread occurrence of two-lined chestnut borer mortality. The was the result of the aforementioned drought and the forest tent caterpillar. This mortality has caused confusion amongst landowners as to the success of the oak wilt program. It also creates a potential problem with tree removal and potential spread of oak wilt via wounding in the spring. This aspect would be less serious if all centers had beene plowed and herbicided as planed in 1989.

The gypsy moth is entering the U.P. Numerous moths were trapped throughout the Eastern U.P. Multiple catches of adults in pheromone traps were common as far east as Luce County. The Menominee County eradication effort using three applications of B.t. showed positive results. A few moths were trapped on the northern boundry of the 300 acre spray block, yet no alternate life stages were detected. No spray program is planned for 1990.

The Jack Pine Budworm epidemic projected for 1989 did not materialize. This reduced risks of jack pine to bark beetles. We had few reports of bark beetle induced losses in red or jack pine.

Lyme's disease continues to be a major concern. Many calls were handled. Our current understanding of Lyme's disease incidence and spread leaves much room for improvement.

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): BRUCE SPANWORM

(SPECIFIC NAME): OPEROPHTERA BRUCEASA

HOST: Sugar Maple, Beech, Yellow Birch & Basswood

PRESENT CONDITION:

AREA (TOTAL ACRES): 0

LOCATION: Dickenson, Delta, Iron & Marquette Counties

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

No measureable defoliation. The widespread Forest Tent Caterpillar epidemic may have masked some localized defoliation.

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Fifth year of since defoliation was first recorded in Iron County, 4th year in other counties.

FUTURE: Expect endemic populations for several years.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: No perceptible impact on tree growth and mortality.

BRIEF NARRATIVE COVERING OVERALL FOREST PEST CONDITIONS

1989

Da bugs were a bitten, an tings weren't lookin too chipper. Dat's when I got da big itch in my head. It said to me to go into those there woods to see about pestilence. I found some alright. The woods camping worms that the upitty-ups call the forest tent caterpillars - they don't really make any tents - were climbing on everything and eatin leaves like mammy wouldn't have it. Counted trees and cyphered over 700,000 acres of chewed on trees. That's a parcel of pestilence. If that isn't enough, Menominee County got triple banged. Oak wilt is about over, but two-lined chestnut borer is about beginnin. Well, let me tell you, just when you'd think the woods only whapped you with Lyme's disease down there, these critters kicked the oaks when they were down. Yup, if dry mouth and no leaves to start the warm spell wasn't enough, they attacked helpless oaks all over the place causin early brown leaves and, generally, lots of free firewood. Better get wet fast next year, or things, they aren't gettin any better.

FOREST PEST MANAGEMENT REPORT
REGION I - UPPER PENINSULA

June 7, 1989

GYPSY MOTH

The gypsy moth is established throughout the Lower Peninsula. Movement of the gypsy moth into the U.P. on recreation vehicles, firewood and outdoor furniture is occurring. This is reflected in the 1988 Michigan permanent trapping program. This program was initiated in 1985 by the Michigan Department of Agriculture (MDA) in cooperation with the MDNR and U.S. Forest Service. The entire state is sampled each year by placing two pheromone traps per township. The 1988 trap catches show portions of eastern Chippewa and Machinac Counties with significant increases in trap catches.

In the Lower Peninsula, 1989 defoliation is expected to exceed 100,000 acres in 15 counties. This is a continued increase from last years 70,350 acres and 1987's 39,443 acres. This increase is expected to continue until all the most vulnerable forest type - oak and aspen (2.9 million acres) - has been affected. Once all vulnerable acreage is affected, populations will begin to cycle at 7-12 year intervals. Michigan has an estimated 12 millions acres of forest with different levels of susceptibility to gypsy moth defoliation.

Private, residential lands in the Lower Peninsula have been sprayed with Bt (a biological insecticide) as part of a cost-share suppression program coordinated by the Michigan Department of Agriculture (MDA). This year, approximately 72,000 acres were sprayed in 11 counties. This protects foliage and reduces nuisances values in residential areas.

An isolated establishing population was detected in southern Menominee County in the U.P. The MDA is committed to an early detection/supression program to prevent the gypsy moth from establishing in the U.P. Thus, 300 acres in Menominee County will be sprayed three times with a biological insecticide (containing B.t.) in late May-early June. This will be an attempt to eradicate this remote infestation. The U.S. Forest Service will pay 50% of the spray costs, the MDA 25% and Menominee County 25%.

The MDNR will be placing gypsy moth traps as in previous years beginning in mid-June.

FOREST TENT CATERPILLAR

I expect this year's defoliation to be as bad or worse than last year's. Homeowners are urged to water valued yard trees during dry spells, and spray trees stressed last year by defoliation &/or drought. Remember, Dipel & Thuricide (B.t. containing biological insecticides) are effective only when sprayed on foliage which is eaten by the caterpillars. If yards or caterpillars are to be sprayed use materials such as malathion, carbaryl or diazinon. Also, point out the abundance of the black ground beetles and grey "house flies" - both which are preying on the forest tent caterpillar larvae,

and will help cause a population collapse. The flies do not bite! I can't say whether populations will be heavy again next year, but will have a better idea in the next two weeks as I observe extent of predation, parasitism and disease. Pat Hallfrisch reports homeowners in the Soo Area using polyethylene (plastic) sheets to prevent caterpillars from crawling up tree trunks. Apparently, if the trunk is wrapped, they won't or can't crawl over the sheeting. This, if effective, plus controlling caterpillars already in tree would be an effective strategy to protect foliage. However, there is little that can be done to reduce nuisance of masses of caterpillars invading property.

In a forest setting, I expect scattered mortality of oaks from last years drought and defoliation. This was evident last summer and will appear for the next few years as armellaria and two-lined chestnut borer mortality. We may see some mortality in aspen and maple, especially in the Eastern U.P. Direct control strategies are not being considered at this time.

BRUCE SPANWORM

Maple, beech and aspen is again being defoliated by the Bruce spanworm. This is a light green, naked larvae that is often noticed as it spins down from tree canopies on a fine web. Defoliation is being reported in many areas of the U.P. Light to moderate thinning of canopies can be expected with some small areas of heavy defoliation.

1988 Bruce Spanworm and Other Loopers Defoliation
Michigan's Upper Peninsula

County	Defoliation Class	Acres
Dickinson	Light	640
Delta	Moderate	3,200
Iron	Light	1,280
	Heavy	160
Marquette	Heavy	480

Totals: Light = 1,920; Moderate = 3,200; Heavy = 640
Total defoliation = 5,760

FOREST TENT CATERPILLAR DEFOLITION - 1988

The following table reports the results of an aerial survey of the 1988 Forest Tent Caterpillar defoliation in Michigan's Upper Peninsula. Defoliation classes are defined as follows:

Light = <30% leaf loss; thinning of tree crown
Moderate = 30-70% leaf loss; very noticeable thinning
Heavy = >70% leaf loss; few leaves remaining

County	Defoliation Class	Acres
Alger	Light	1,700
	Moderate	3,840
	Heavy	5,860
Baraga	Moderate	640
Chippewa	Light	5,760
	Moderate	100,000
	Heavy	60,000
Delta	Light	20,480
	Moderate	3,840
Dickinson	Light	3,240
	Moderate	16,310
	Heavy	1,720
Houghton	Moderate	2,560
Keweenaw	Moderate	800
Luce	Light	5,120
	Moderate	1,280
	Heavy	640
Mackinac	Light	40,040
	Moderate	13,720
	Heavy	12,160
Marquette	Light	2,560
	Moderate	6,400
	Heavy	3,200
Menominee	Moderate	1,320
	Heavy	1,000
Ontonogon	Light	5,120
Schoolcraft	Light	5,000
	Moderate	3,360
	Heavy	1,920

Totals: Light = 90,300; Moderate = 154,070; Heavy = 86,500
Total Defoliation = 330,870

WINTER INJURY

The following is an excerpt from the May issue of the "Minnesota Insect & Disease Newsletter".

Young seedlings and saplings are most susceptible to temperature extremes and dehydration in the spring. Winter injury to hardwoods is rarely evident until spring, when the buds don't open or the expanding leaves wilt or look tattered. Injury to conifers is evident in late winter and during the spring when the foliage discolors, usually turning red, starting at the needle tips.

There are four types of injury related to cold temperatures and dehydration: sunscald, winterburn, winter drying and frost damage.

Sunscald occurs anytime during the winter or early spring when the bark has thawed due to the warmth of the sunshine, but the air temperature is still below freezing. Sunscald is caused by the lethal freezing of water in the stem and bark after the warming sunlight is decreased or blocked. Thin-barked trees and saplings are particularly susceptible. Damage is found on the south or southwest sides of the tree. Look for cracked bark, sunken cankers, and, if the cambium and sapwood are killed, loose bark with dead sapwood below.

Winterburn occurs in the late winter, well before budbread. At this time of year, plant metabolism is slowly reactivating. Water is moving in and out of cells. Winterburn is due to water freezing inside plant cells. If enough cells are killed, leaf or twig tissues are killed. They happens when a temporary warm spell is suddenly broken by very cold weather - freezing cell water. Winterburn can also happen when the warming sunlight is suddenly blocked and the needles rapidly cool - freezing cells. On conifers, the needles turn red and sometimes buds are killed. When hardwood buds and twigs die, multiple shoots sprout below the dead tissues on the stem. Winterburn is most common on the south and southwest exposures of trees and plantations.

Winter drying occurs in late winter and early spring when warm, dry winds desicate needles and twigs. At this time of year, roots are not active and water in the soil is frozen, but the shoots and needles are transpiring. There isn't any water to transport to the shoots, so needles progressively dehydrate as they transpire. Affected needles turn red from the tip down and often have a mottled appearance. Buds are usually not killed. Normally, snow cover prevents winter drying of young conifers by providing shelter from drying winds and by preventing deep frost formation in the soil. In some years it's common to see young conifers with a strong line of demarcations separating the brown, desicated tops from the healthy, green branches that were snow covered.

Frost injury occurs in the early spring, prior to, during and after budbreak. New, expanding shoots are particularly susceptible. Ice crystals form inside cells and tissues, killing them. Conifer shoots droop and turn red or straw-colored. Frost damage is more severe on conifers because no new shoots develop to replace the frost-killed shoots. Hardwood leaves can be damaged while still in the bud. After they expand, the leaves have holes in them or look altered. Frost-killed leaves turn black, are shed and then replaced.

SALT INJURY - WHITE PINE

White pine is especially sensitive to road salt. The affects of a long winter with corresponding multiple applications of road salt is particularly evident this time of the year. The foliage of large trees is burned primarily on the road-side of the tree. The tops of smaller trees are burned, again with the most severe burning on the road-side. Branches protected by snow cover are unaffected. Winds can carry salt-laden moisture to the tops of the tallest white pine. A prevailing wind pattern may also cause white pine on one side of the road to burn more than the other.

YELLOW-HEADED SPRUCE SAWFLY

Watch for defoliation of small and ornamental spruce. The yellow-headed spruce sawfly will quickly kill small spruce and seriously degrade spruce x-mas trees. Vigilant monitoring is advised for the next six weeks. Eggs are usually laid as bud caps are shed. Larvae then emerge in the next 7-14 days - but can emerge as late as July. Spray larvae with malathion or carbaryl. If larvae are very small, either wait a few days to spray to insure complete egg hatch, or continue to monitor and spray again if larvae are detected. Shouldn't have to monitor more than 2-3 weeks after initial egg hatch in an area. However, different areas - even in the same township - may vary. So, don't assume the sequence of events in one area is necessarily synchronized with other areas.

OAK WILT

Oak wilt was detected in the Shakey Lakes Area of Menominee County in 1981. It was likely introduced into the area in early 1950's. Control efforts began in 1982. Of the 236 detected epicenters to date, all but 30 have vibratory plow lines established to stop root graft transmission of the disease. Only 7 new epicenters were detected in 1988. All epicenters have undergone or are undergoing sanitation to remove inoculum to prevent the occasional over-land spread of the disease.

Over 4,000 trees have been lost to date. Many of these are valued landscape trees. Without a control program, we would lose most of this unique, 10,000 acre oak resource. All untreated epicenters will have vibratory plow lines established in 1989. All diseased and currently non-diseased trees within the plow lines are being killed or removed in 1989. These trees have or will succumb to oak wilt and produce inoculum which can cause overland spread of the disease if not removed. We hope to eventually eliminate the disease from this area.

This control project is a cooperative effort funded by the Michigan Department of Natural Resources and the Michigan Department of Agriculture with support funding also coming from the Menominee Board of Commissioners and Lake Township. Michigan Technological University is supervising and researching control efforts. The Michigan State University Cooperative Extenstion Service, Menominee County is helping with landowner contacts and public relations.

LYME DISEASE - TICK COLLECTING

A summary report will be circulated at the end of the summer showing the number, species and distribution of ticks collected by MDNR personnel in 1989. If Lyme Disease is isolated from living specimens, this information will also be reported. Remember, send specimens directly to Neil Pennington, MDA, in Lansing. They have been very prompt in responding to written inquires. I have asked them to only call during the summer if deer ticks (Ixoides sp.) are identified, or if Lyme Disease is isolated from specimens.

JACK PINE BUDWORM

Budworm larvae are beginning to feed in male cones. Defoliation should be evident in the next couple of weeks in affected areas. The Baraga Plains and Danaher Plains area will experience defoliation again this year. Based on last year's population samples, we could see involvement in other areas this year. A wide-spread, low level insurgence was detected last year. An aerial survey of U.P. jack pine on state and private land will be flown in July after this year's feeding damage has ended.

IPS - BARK BEETLES

Although the drought seems to have disappeared, we may still have some bark beetle populations hanging around from last year. These will only cause problems if we re-enter a drought period this summer, or if we practice poor harvesting procedures - especially on sandy sites. Remember, avoid decking logs on site for more than two weeks, utilize as much of the tops as possible and scatter slash over the site to enhance drying - making it unsuitable for the bark beetle. Slash piles can be sprayed with materials such as Dursban if problems appear or are expected, but this requires the presence of a Certified Pesticide Applicator, or a Commercial Pesticide Applicators License depending on the situation. Check with the Michigan Department of Agriculture if unsure. If the drought reappears, delaying the harvest until late August to early October is a possible control alternative for high risk sites. This time period serves two purposes: 1) bark beetle populations do not have time to build before cold temperatures, and 2) slash created has time to dry before cold temperatures, making it unsuitable for the beetle the following spring. Late fall or winter harvest may produce slash which is still moist enough to produce bark beetles the next spring. This may or may not be a problem depending on site, tree condition, and drought conditions the following year.

Pest Conditions Report - Minor Pest Problems
Michigan's Upper Peninsula
1989

PEST	HOST(S)	COUNTIES	REMARKS
Aphids	Jack Pine Scotts Pine	Michigan's Upper Peninsula	Commonly present in young jack pine stands before crown closure. Occasional heavy populations causing wilt symptoms in individual trees.
Aspen Blotch Miner (Lithocolletis tremuloidiella)	Quaking Aspen	Michigan's Upper Peninsula	Damage noticeable, but not heavy in most areas.
Armellaria (Armellaria mellea)	Jack Pine Red Pine	Michigan's Upper Peninsula	Scattered mortality in young pine plantations.
Birch Leafminer (Fenusa pusilla)	White or Paper Birch	Michigan's Upper Peninsula	Locally heavy populations
Eastern Tent Caterpillar (Malacosoma americanum)	Prunus sp. Malus sp.	Michigan's Upper Peninsula	Extremely heavy populations producing unsightly roadsides. Most noticeable in Southern portion of U.P.
Fall Cankerworm (Alsophila pometaria)	Sugar Maple Other Hardwoods	Michigan's Upper Peninsula	Little detected defoliation. Activity could have been masked by widespread forest tent caterpillar epidemic.
Gall Rusts (Cronartium quercuum)	Jack Pine Scotts Pine	Michigan's Upper Peninsula	Common in jack pine areas. Impacts on tree growth and form are minimal.

Hypoxylon Canker (Hypoxylon mammatum)	Quaking Aspen	Michigan's Upper Peninsula	Found commonly throughout the U.P. Where heavy, severely limits the growth and survival of aspen.
Large Aspen Tortrix (Choristoneura conflictana)	Quaking Aspen	Michigan's Upper Peninsula	Especially noticeable in Eastern U.P. in areas defoliated by the Forest Tent Caterpillar. Aspen subject to many stressing factors including a record setting drought.
Linden Looper (Erannis tiliaria)	Maple Basswood	Michigan's Upper Peninsula	No detected defoliation. Presence could have been masked by widespread forest tent caterpillar epidemic.
Maple Decline	Sugar Maple	Michigan's Upper Peninsula	Continuing problem in urban areas. Pockets of decline detected on wet, lowland sites associated with a white root rot.
Pine Root Collar Weevil (Hylobius radicus)	Scotts Pine	Michigan's Upper Peninsula	Limits the utility of scotts pine as an economically viable candidate for reforestation efforts in the Upper Peninsula.
White Grubs (Phyllophaga sp.)	Jack Pine Red Pine	Michigan's Upper Peninsula	White grubs continue to be a problem on old field type planting sites.
White Pine Weevil (Pissodes strobi)	Jack Pine	Baraga Marquette	Heaviest areas with 10% weevilling. Although easily found, damage is not widespread problem as in Northern Lower Peninsula.
White Trunk Rot of Aspen (Phellinus tremulae)	Quaking Aspen	Michigan's Upper Peninsula	A large portion of our aspen resource is mature or overmature and in need of harvesting.

1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): OAK WILT

(SPECIFIC NAME): CERATOCYSTIS FAGACEARUM

HOST: OAKS

PRESENT CONDITION:

AREA (TOTAL ACRES): 10,000 ACRES

LOCATION: SHAKEY LAKES AREA, MENOMINEE COUNTY

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

Over 4,000 trees lost to date. Many of these with values as landscape trees. Without control program, would lose most of this oak resource.

TREND:

PAST TO PRESENT: Detected in 1981. Likely introduced into the area in early 1950's. Greatest loss of trees in later years as epicenters increased in number and size. Control efforts began in 1982. All 236 detected epicenters have vibratory plow lines established to stop root graft transmission. Only 7 newly established epicenters in 1988. No new epicenters detected in 1989.

FUTURE: Goal is to eventually eliminate the disease from this area.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

Project funding for 1989 was $25,000. This pays for a week of vibratory plowing; a full time seasonal employee living in area to detect new epicenters and follow up on reports, map new centers, mark trees for removal, lay out plow lines, and handle public relations; herbicide to kill trees within the inner vibratory plow line; and the part time involvement of a forest pathologist from Michigan Technilogical University, Houghton, MI.

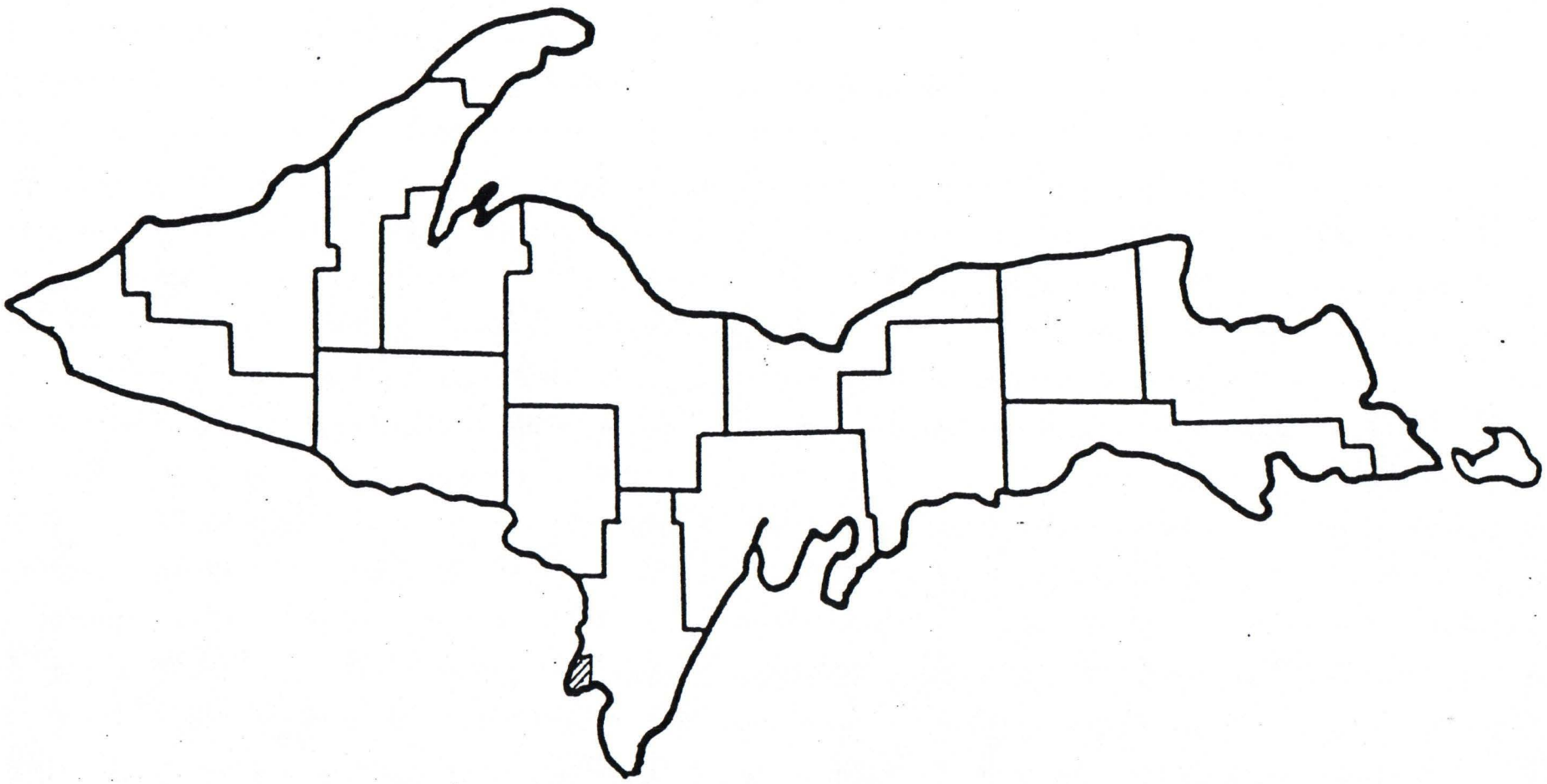
COMMENTS:

Once all trees within inner plow lines are removed, the opportunity for over-land spread of the disease will be minimal. Diligent surveillance from this point onward should allow us to easily control any newly introduced epicenters at much less cost.

OAK WILT AND TWO-LINED CHESTNUT BORER AREA

SHAKEY LAKES AREA OF MENONIMEE COUNTY

1989



1989 PEST CONDITIONS REPORT

PEST (COMMON NAME): OAK DECLINE - Two-lined chestnut borer
Armellaria
Drought

(SPECIFIC NAME): Agrilus bilineatus
Armellaria mellea

HOST: RED OAK

PRESENT CONDITION:

AREA (TOTAL ACRES): SCATTERED POCKETS AND SINGLE TREES

LOCATION: MICHIGAN'S UPPER PENINSULA

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):
Widespread areas of tree mortality in southwestern Menominee County. Scattered pockets ranging from a fraction of an acre to several acres in size. Although less than 1/2% of the existing 10,000 acre oak resource of this area was lost in 1989, given a dry spring and early summer in 1990, and possible Forest Tent Caterpillar defoliation, we could have significantly greater oak mortality throughout this area.
Other U.P. counties reported patches of oak mortality. Primary agent has been the two-lined chestnut borer.

TRENDS

PAST TO PRESENT: Oak decline and eventual tree mortality is an expected consequence of drought stress. (See Drought Report)

FUTURE: We will continue to lose oaks from this drought and associated secondary agents for the next year or two even without continued drought conditions.

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: Salvage of severely declining and dead oaks is recommended. Two-lined chestnut borer adults will emerge next June from infested trees. These trees should ideally be cut into lumber, burned as firewood, or moved to a non-oak landscape before adult emergence next June. Tree removal in marked oak wilt pockets should be approved by agency involved in control operations.